Phase 1: Graphene-Based Products - Manufacturing Manual

1. Introduction

This manual provides step-by-step instructions for the production of Phase 1 graphene-based products. Each section includes material handling, equipment usage, manufacturing steps, and quality control measures.

2. Graphene-Based Thermal Paste

Market: PC & Industrial Cooling

Purpose: Improves thermal conductivity for CPUs, GPUs, and power electronics.

Materials Required:

- Graphene powder (5-20%)
- Silicone oil or ester-based oil
- Zinc oxide or boron nitride (~5-10%)
- High-purity dispersant (optional)

Equipment Needed:

- Ultrasonic Mixer
- High-Shear Mixer
- Vacuum Filtration System
- Precision Scales
- Syringes for Packaging

Step-by-Step Manufacturing Process:

1. Weigh out graphene powder according to the required formulation.
2. Add graphene to the ultrasonic mixer with silicone oil and begin mixing.
3. Introduce zinc oxide or boron nitride in small increments while mixing.
4. Use a high-shear mixer to ensure a smooth, homogenous dispersion.
5. Filter impurities using a precision filtration system.
6. Test viscosity and adjust formulation if necessary.
7. Package the final product in pre-measured syringes.
8. Conduct quality control tests before distribution.

3. Graphene-Enhanced Lubricants & Greases

Market: Automotive, Aerospace, Industrial Machinery

Purpose: Reduces friction and wear for high-performance applications.

Materials Required:

- Graphene powder (0.1-3%)
- Synthetic base oil (PAO) or mineral oil
- Dispersant (Oleic acid or sorbitan monooleate)
- Thickener (for grease formulations)

Equipment Needed:

- Ultrasonic Mixer
- High-Shear Mixer
- Vacuum Filtration System
- Storage Tanks for Bulk Production
- Packaging Bottles & Containers

Step-by-Step Manufacturing Process:

1. Weigh out graphene powder according to formulation.
2. Add graphene to the ultrasonic mixer along with base oil and start dispersing.
3. Slowly introduce dispersant (Oleic acid or sorbitan monooleate) while mixing.
4. Use a high-shear mixer for final homogenization.
5. If making grease, add thickener and continue mixing until desired consistency is achieved.
6. Filter out impurities and package in bottles or grease containers.
7. Conduct quality control tests before final distribution.

4. Faraday Paste (Signal Blocking Coating)

Market: Privacy, Security, Military Defense

Purpose: Blocks wireless signals by forming a conductive shielding layer.

Materials Required:

- Graphene powder (5-20%)
- Carbon black (~5%)
- Copper or silver flakes (5-15%)
- Polymer binder (40%)
- Solvent (Acetone, ethanol, or water)

Equipment Needed:

- Ultrasonic Mixer
- High-Shear Mixer
- Vacuum Oven (for curing)
- Precision Scales
- Paint Mixing Equipment
- Packaging Containers (Paint Cans or Spray Bottles)

Step-by-Step Manufacturing Process:

1. Disperse graphene, carbon black, and metal flakes in solvent using ultrasonic mixing.
2. Slowly add polymer binder while stirring continuously.
3. Use a high-shear mixer to achieve smooth dispersion.
4. Adjust viscosity for sprayable or brush-on application.
5. Conduct electrical conductivity tests to ensure shielding effectiveness.
6. Cure the coating in a vacuum oven if required.
7. Package in paint cans or spray bottles for sale.
8. Perform final quality control before distribution.